PRELIMINARY INVESTIGATION OF THE RAILSPUR CHEMONICS INDUSTRIES 734 E. SOUTHERN PACIFIC DRIVE PHOENIX, ARIZONA 85036

Prepared by:

THE EARTH TECHNOLOGY CORPORATION
2411 West 14th Street,
Suite 210
Tempe, Arizona 85281

December 1990

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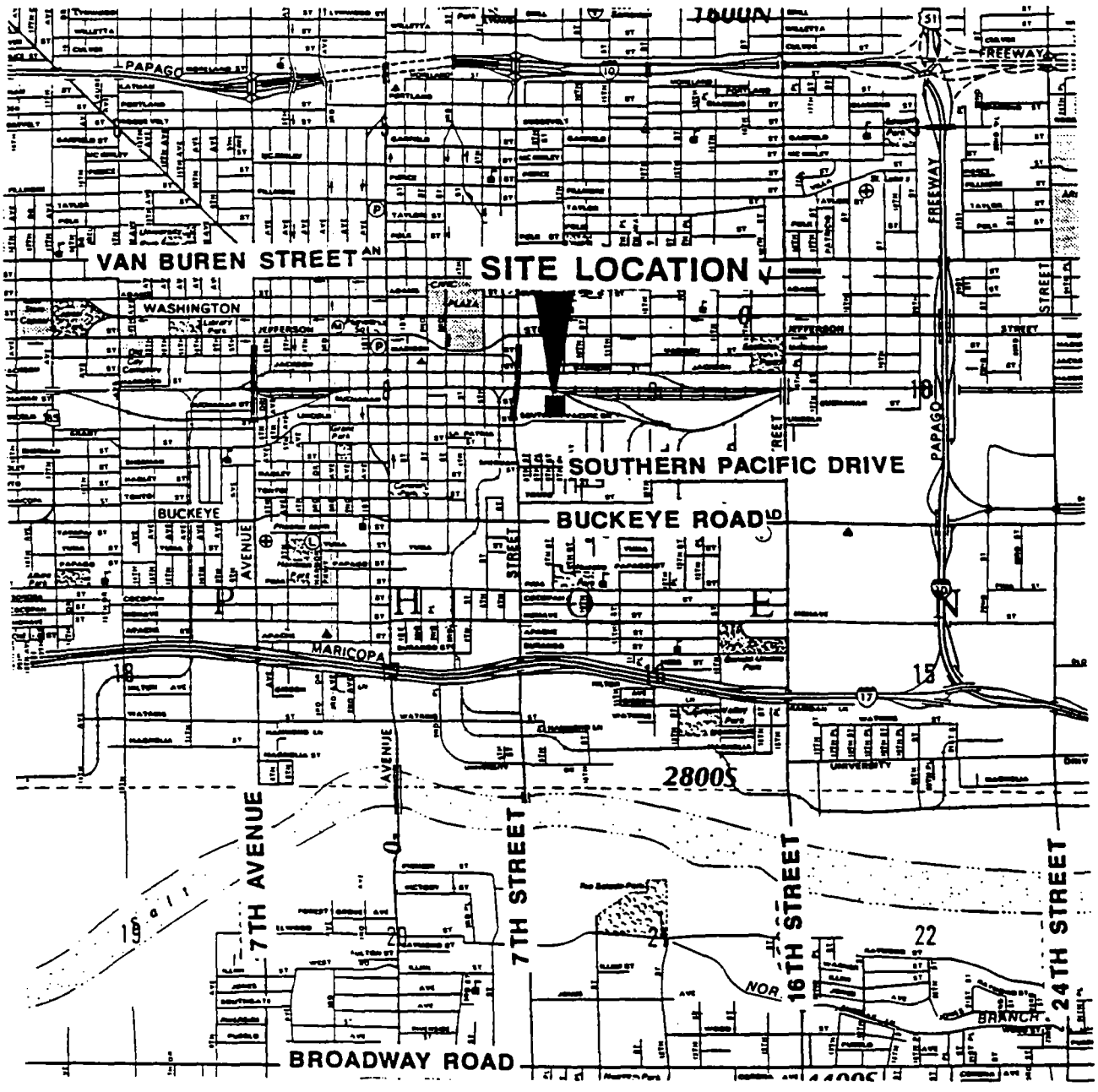
1.0 INTRODUCTION

1.1 BACKGROUND

The Earth Technology Corporation (Earth Technology) was retained to perform a soil sampling investigation of the railroad spur located adjacent to the northern property boundary of the Chemonics Industries, Inc. (Chemonics) facility. The Chemonics facility is located at 734 E. Southern Pacific Drive, Phoenix, Arizona (Figure 1-1). The site consists of approximately 4.5 fenced acres and is bounded by Southern Pacific Drive on the south and the Southern Pacific Railroad tracks on the north. Capital Engineering is located to the west, at 724 E. Southern Pacific Drive. The area to the east appears to be used for truck parking and railroad car unloading and switching. Chemonics has been affiliated with the subject property since the 1940's. The company has undergone changes in name and corporate structure over the years. Arizona Fertilizer received, formulated, packaged, and shipped agricultural chemicals including fertilizers, and pesticides. The agricultural chemicals were received and shipped by truck and by a 420-foot railroad siding (Figure 1-1) along the northern property boundary. Pesticides were handled at the facility by Arizona Fertilizer from approximately 1950 through 1953. The pesticide operation was discontinued in approximately 1953. Fertilizers were handled on site by Arizona Fertilizer and subsequently by Arizona Agrochemical until 1970. During the 1970s, the company began doing business as Chemonics Industries and discontinued their agricultural chemical handling due to the sale of Arizona Agrochemical. After that time, Chemonics' business activities centered around the research and development of fire retardant chemicals (Firetrol), storage of Firetrol products, maintenance of related ancillary field equipment and corporate offices.

In 1989, Capitol Engineering, located adjacent to the subject facility, contracted Water Resources Associates, Inc. (WRA) to conduct an environmental assessment and site inspection of the



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0 1 2 mi

SCALE IN MILES

MS 03220

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Project No: 90-621
Chemonics Industries

SITE LOCATION
734 EAST SOUTHERN PACIFIC DRIVE
PHOENIX, ARIZONA

Figure 1-1 12-90

Capitol Engineering properties. Two soil samples collected in the railroad spur area during WRA's investigation indicated the presence of polychlorinated biphenyls (PCBs) and organochlorine pesticides (DDT, DDE). During March 1990, additional sampling was performed by WRA for Capitol Engineering in the railroad spur area to further evaluate the presence of organochlorine pesticides and PCBs. A number of organochlorine pesticides were identified at shallow depths and in low concentrations during this investigation. Pesticides identified included DDT, DDE, DDD; chlordane; various isomers of benzene hexachloride (BHC); dieldrin; and toxaphene. No PCBs were identified. As a result of their investigations, WRA recommended that additional sampling be conducted in upgradient areas, including the railroad spur adjacent to Chemonics, to evaluate the extent of pesticides.

1.2 OBJECTIVES

The primary objective of this soil sampling investigation was to assess the presence of organochlorine pesticides in the railroad spur adjacent to the northern perimeter of the subject property. To accomplish this objective, a Soil Sampling Plan was prepared and implemented in accordance with the guidelines provided in the ADEQ Quality Assurance Project Plan (QAPP), dated December 1989. The sampling plan, provided in Appendix A, discusses (1) the rationale used to determine the locations, depths, and numbers of samples; (2) relationship between sample locations and suspected areas of contamination; (3) analyses to be performed; (4) sample collection and preservation procedures; (5) Quality Assurance/ Quality Control (QA/QC) methods and procedures; and (6) a Site Safety Plan.

The results of the soil sampling investigation and Earth Technology's conclusions and recommendations regarding potential contamination in the rail spur area are discussed in the following sections.

2.0 RAIL SPUR INVESTIGATION

2.1 SAMPLING METHODOLOGY AND PROCEDURES

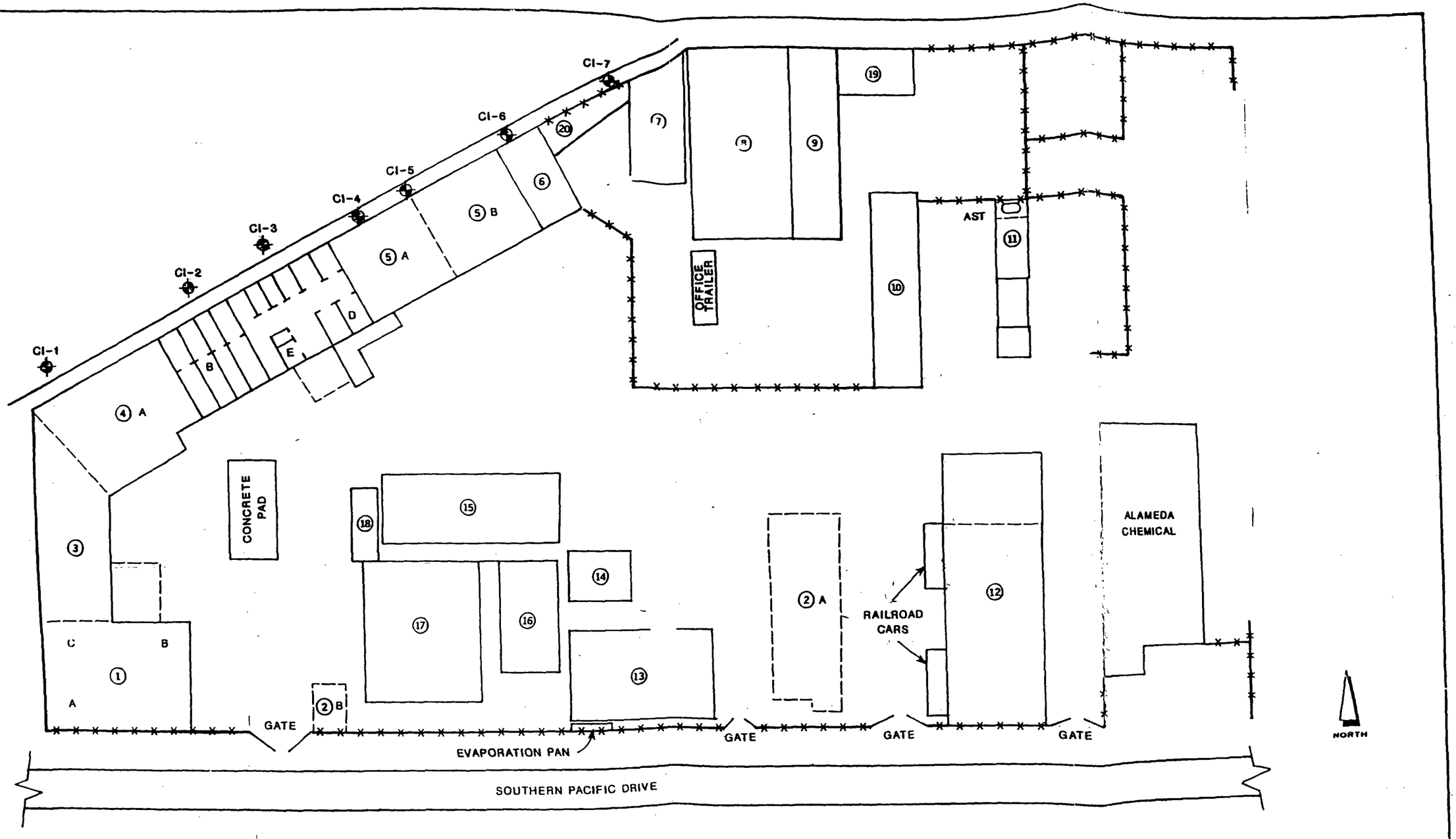
On June 6, 1990, a total of 13 soil samples were collected at 7 separate locations along the rail spur adjacent to the subject property. Soil sample locations shown on Figure 2-1 were selected based on previous sampling conducted at adjacent facilities and historical property use. Soil samples were collected at depth intervals of 0 to 0.5 feet, 1 to 1.5 feet, and 2 to 2.5 feet at sample locations CI-1, CI-2, and CI-3. The sample intervals selected at these locations are consistent with previous sampling conducted in the rail spur area. Additionally, 4 soil samples (CI-4, CI-5, CI-6, and CI-7) were collected from 0 to 0.5 feet along the eastern portion of the rail.

All soil samples were collected using a stainless-steel hand auger with a 3-inch diameter core barrel. The samples were collected in accordance with the methods and procedures described in the Sample Plan presented in Appendix A and sampling equipment was thoroughly decontaminated between sampling events at each location. All samples were labeled, sealed, placed on ice and transported to the laboratory following standard chain-of-custody procedures.

2.2 REQUEST FOR ANALYSIS AND ANALYTICAL RESULTS

Thirteen samples collected at 7 sample locations (CI-1 through CI-7) along the rail spur were analyzed for organochlorine pesticides using EPA Method 8080. Compounds detected in the analyses of the 13 samples are summarized in Table 2-1. Laboratory analytical reports are provided in Appendix B.

During 1990, ADEQ in conjunction with ADHS, developed ingestion health-based guidance levels (I-HBGLs) through a risk assessment approach that is based on an average daily ingestion of soil over a 70 year lifetime. The average soil ingestion values suggested by



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Project No: 90-621
Chemonics Industries

SAMPLE LOCATIONS
CHEMONICS INDUSTRIES
734 EAST SOUTHERN PACIFIC DRIVE
PHOENIX, ARIZONA 85034

Figure 2-1 12-90

Table 2-1. Summary of Compounds Detected by Analysis for Organochlorine Pesticides and PCBs (EPA Method 8080)

Sample No.	Depth Interval (feet)	Analytical Results (mg/kg)(a)							
		Alpha BHC	Beta BHC	Gamma BHC	Delta BHC	DDT/DDE/DDD	Dieldrin	Toxaphene	Chlordane
CI-1-1	0 - 0.5	78	16	43	40	1291	<20(b)	<200	<100
CI-1-2	1 - 1.5	5.4	0.47	13	3.2	3.7	<1.0	<10	<5.0
CI-1-3	2 - 2.5	0.12	<0.05	0.28	0.22	<0.1	<0.1	<1.0	<0.5
CI-2-1	0 - 0.5	<1.0	1.1	<1.0	<1.0	26	<2.0	<20	<10
CI-2-2	1 - 1.5	0.0064	0.027	<0.005	<0.005	0.016	<0.01	<0.1	<0.05
CI-2-3	2 - 2.5	<0.005	0.0065	<0.005	<0.005	<0.01	<0.01	<0.1	<0.05
CI-3-1	0 - 0.5	<0.025	0.041	<0.025	<0.025	0.44	<0.05	0.99	<0.25
CI-3-2	1 - 1.5	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.1	<0.05
CI-3-3	2 - 2.5	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.1	<0.05
CI-4	0 - 0.5	<2.5	<2.5	<2.5	<2.5	82	7	130	<25
CI-5	0 - 0.5	<0.5	<0.5	<0.5	<0.5	10.3	<1.0	10	<5.0
CI-6	0 - 0.5	<0.5	<0.5	<0.5	<0.5	15.9	<1.0	13	<5.0
CI-7	0 - 0.5	<1.0	<1.0	<1.0	<1.0	40.3	<2.0	<20	<10
I-HBGL(c)		NE(d)	NE	NE	NE	2	0.02	0.6	0.4

Note: (a) mg/kg = milligrams per killigram

(b) <0.01 = Not Detected at the Specified Laboratory Detection Limit

(c) I-HBGL = Arizona Department of Environmental Quality (ADEQ) proposed 1990 Ingestion Health-Based Guidance Levels for Soil

(d) NE = Not Established

the U.S. Environmental Protection Agency (EPA) of 0.2 grams per day for children 1 to 6 years old and 0.1 grams per day for ages 7 to 70 years were used to develop the I-HBGLs.

The I-HBGLs were calculated to result in a life time exposure equivalent to that resulting from ingestion of 2 liters of water per day containing the contaminant at drinking water HBGLs or maximum contaminant levels (MCLs). These ingestion rates were used in the development of the 1990 I-HBGLs and are more representative of conditions that would be expected to be encountered in the field at most sites. For substances considered by EPA to be carcinogenic, the HBGL values were derived by calculating the concentration that would result in an excess cancer risk below one in one million. The use of a consistent methodology for determining the I-HBGLs led in a few cases to results that are not physically possible (i.e., I-HBGL below laboratory detection limit). In these cases, ADEQ suggests that the laboratory detection limit should be used as guidance. ADEQ's proposed 1990 I-HBGLs are included in Table 2-1 for comparison with the analytical results.

The analytical results indicate the presence of certain pesticides along the length of the rail spur. Pesticides detected include alpha, beta, gamma, and delta BHC, DDT/DDD/DDE, Dieldrin, and Toxaphene. Other organochlorine pesticides included in the EPA Method 8080 were not detected above laboratory detection limits.

The concentrations of DDT/DDD/DDE in the samples collected from 0 to 0.5 feet range from a high of 1,291 milligrams per kilogram (mg/kg) in sample CI-1-1 to a low of 0.44 mg/kg in sample CI-3-1. All samples collected from this sampling interval except CI-3-1 exceed the ADEQ proposal 1990 I-HBGL of 2 mg/kg for combined DDT/DDD/DDE. Additionally, the I-HBGL for DDT/DDD/DDE is exceeded in sample CI-1-2, collected from 1.0 to 1.5 feet below land surface. This is also the sample location where the highest concentrations of DDT/DDD/DDE (1,291 mg/kg) were detected in the 0

to 0.5 foot sample (CI-1-1). The concentration of DDT/DDD/DDE fell below the I-HBGL in the remaining two samples collected from 1.0 to 1.5 feet and in all samples collected from 2.5 to 3.0 feet.

Concentrations of toxaphene were found exceeding the I-HBGL towards the eastern end of the rail spur. Concentrations in samples CI-4, CI-5, CI-6, were 130 mg/kg, 10 mg/kg and 13 mg/kg, respectively. Concentrations of toxaphene did not exceed the laboratory detection limit in the other samples. Dieldrin was detected at a concentration of 7.0 mg/kg in sample CI-4, which exceeded the I-HBGL of 0.02 mg/kg. Additionally, alpha, beta, gamma, and delta BHC were detected in concentrations ranging for a high of 78 mg/kg to a low of 0.22 mg/kg. There is no proposed I-HBGL for these compounds.

3.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

A soil sampling investigation was conducted by Earth Technology for Chemonics Industries in the area of the railroad spur adjacent to the northern property boundary of the Chemonics facility. The facility is located at 734 East Southern Pacific Drive. This soil sampling investigation was conducted as a result of a site assessment and soil sampling investigation conducted by WRA at Capitol Engineering located adjacent to Chemonics at 724 East Southern Pacific Drive.

A total of 13 samples were collected at 7 locations along the railroad spur. The samples were analyzed for organochlorine pesticides using EPA Method 8080. Analytical results indicate the presence of DDT/DDE/DDD, Dieldrin and toxaphene in concentrations exceeding the ADEQ proposed 1990 I-HBGLs in samples collected from 0 to 0.5 feet. BHC was also detected in this sample interval, however there are no I-HGBLs for this group of pesticides. The remaining organochlorine pesticides included in EPA Method 8080 were below laboratory detection limits in the sampling interval. Analytical results for sample CI-1-2 collected at 1 to 1.5 feet exceeded the proposal I-HBGL. All other samples collected at 1 to 1.5 feet and all samples collected at 2 to 2.5 feet indicate that organochlorine pesticides were not detected above laboratory detection limits or were detected at concentrations below applicable ADEQ proposed I-HBGLs.

Standard laboratory detection limits exceed ADEQ proposed 1990 I-HBGLs for aldrin, chlordane, dieldrin, toxaphene, and PCBs. ADEQ suggests that in cases where I-HBGLs are below laboratory detection limits, the laboratory detection limit should be used as guidance. Additionally, during this investigation, samples were diluted due to high concentrations of DDT, DDD, DDE and therefore laboratory detection limits were higher in some cases than standard limits. Because of this dilution and the associated increase in detection limits, some substances may be present at concentrations above the standard laboratory detection limits. However, DDT/DDD/DDE is present at shallow depths along the length of the rail spur at

concentrations exceeding the ADEQ proposed 1990 I-HBGL. Based on these results, DDT/DDE/DDD concentration will be used as an indicator pesticide during subsequent actions.

Earth Technology recommends that this preliminary investigation be followed up with an additional sampling investigation to further establish the vertical and lateral extent of organochlorine pesticides at the site. The data gathered during this investigation will be used in determining necessary subsequent actions.

4.0 LIMITATIONS

The conclusions and professional opinions presented in this report were developed by The Earth Technology Corporation in accordance with generally accepted engineering, geological, and hydrogeological principles and practices. This warranty is in lieu of all other warranties either expressed or implied.

This report has not been prepared for use by parties other than Chemonics Industries. It may not contain sufficient information for the purposes of other parties or other uses. The data, interpretations, conclusions, and recommendations contained herein should be considered to relate only to the specific project and location discussed herein. The Earth Technology Corporation is not responsible for any conclusions or recommendations that may be made by others, unless we have been given an opportunity to review such conclusions or recommendations and concur in writing.

APPENDIX A

SOIL SAMPLING PLAN
734 EAST SOUTHERN PACIFIC DRIVE
PHOENIX, ARIZONA

RAIL SPUR INVESTIGATION
SOIL SAMPLING PLAN
734 E. SOUTHERN PACIFIC DRIVE
PHOENIX, ARIZONA

Prepared by:

THE EARTH TECHNOLOGY CORPORATION
2411 West 14th Street
Suite 210
Tempe, Arizona 85281

June 1990

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1.0 INTRODUCTION

This sampling plan contains information concerning the site and a description of the tasks to be performed during the Sampling Investigation at 734 E. Southern Pacific Drive for Chemonics Industries, Inc. (Chemonics). Earth Technology has developed this sampling plan in accordance with the procedures in the U.S. Environmental Protection Agency's (EPA, 1986) "Test Methods for Evaluating Solid Waste" and the Arizona Department of Environmental Quality's (ADEQ, 1988) "Quality Assurance Project Plan".

2.0 BACKGROUND

The Chemonics Phoenix facility is located at 734 E. Southern Pacific Drive, Phoenix, Arizona 85034. The site consists of 4.457 fenced acres and is bounded by Southern Pacific Drive on the south and the Southern Pacific Railroad tracks on the north. Capitol Engineering is located to the west, at 724 East Southern Pacific Drive. The area to the east appears to be used for truck parking and railroad car unloading and switching.

On site are buildings consisting of warehousing, fabrication, office, and laboratory having a combined space of approximately 194,147 square feet. The facility is currently occupied by Chemonics Industries and five (5) sublessees.

Chemonic's facility lies within the East Washington Water Quality Assurance Revolving Fund (WQARF) study area. Six areas in the East Washington area were identified in which concentrations of volatile organic compounds (VOC's) exceeded maximum contaminant levels (MCL's) or Arizona Action Levels (AAL's).

Water Resource Associates, Inc. (WRA) conducted an environmental assessment and site investigation of the Capitol Engineering properties located immediately west of Chemonics in response to the Draft Phase I Report, Eastlake Park Area, October 1988. Sampling conducted by WRA during their investigation indicated the presence of organochlorine pesticides along the railroad spur north of the property. The railroad spur originates from a switching yard located east of Chemonics.

3.0 OBJECTIVE OF SAMPLING EFFORT

The primary objective of this sampling investigation is to assess the presence of chlorinated pesticides on the railroad spur adjacent to the northern perimeter of the subject property. To accomplish these objectives, Earth Technology has prepared this sampling program. The following sections provide the sampling rationale, locations, analyses, methodology and procedures.

4.0 SAMPLING RATIONALE

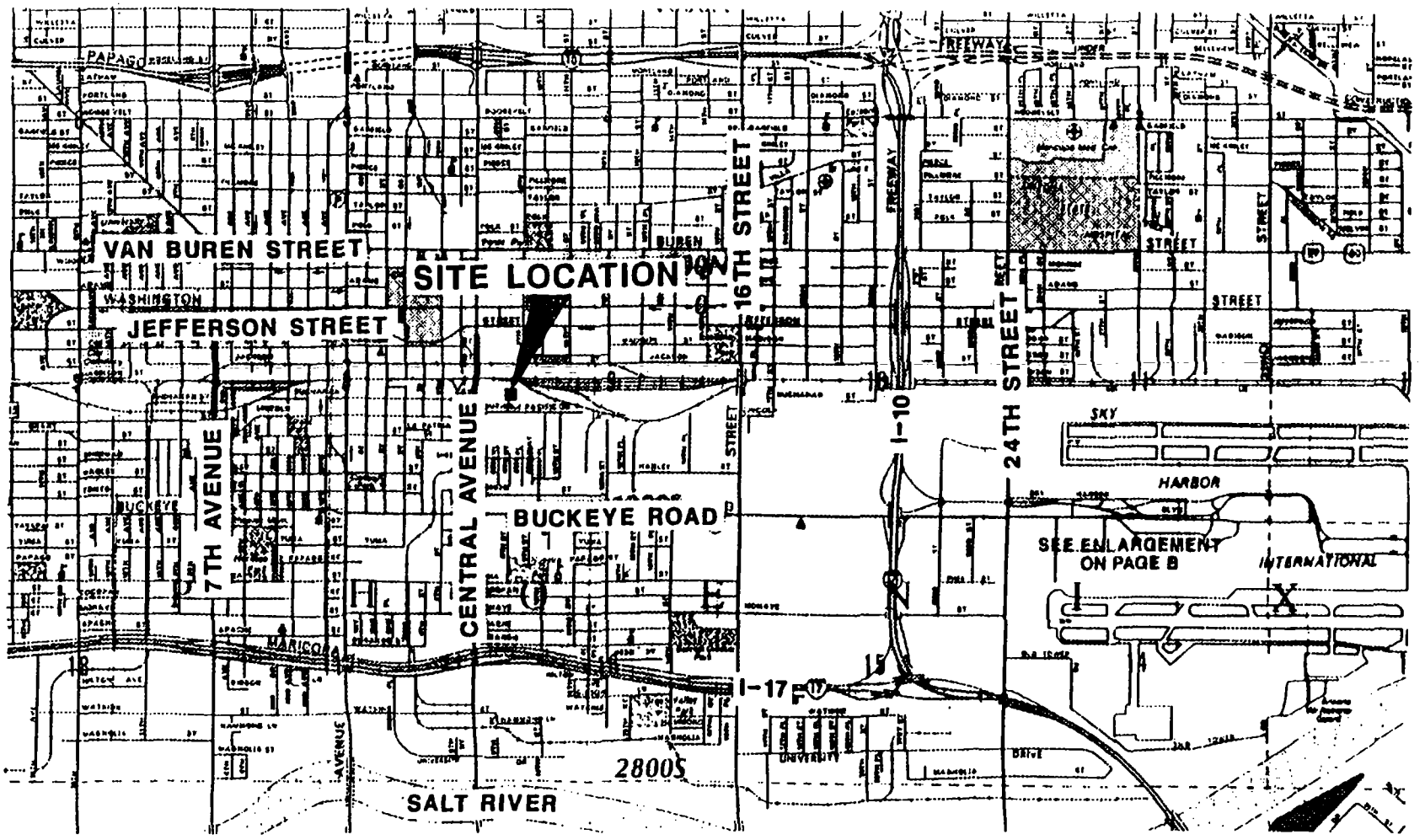
The sampling rationale is based on the objectives of the sampling program, specifically evaluation of the presence of chlorinated pesticides on the railroad spur along the northern perimeter.

4.1 SAMPLING LOCATIONS

Soil sample locations were selected based on previous sampling conducted at adjacent facilities. Seven locations along the northern property boundary will be sampled. Samples will be collected at depth intervals from 0 to 0.5 feet, 1 foot to 1.5 feet and 2 feet to 2.5 feet at the western 3 locations. The depths of 0 to 0.5 feet, 1 foot to 1.5 feet and 2 feet to 2.5 feet are consistent with previous sampling in the area. Additionally, 4 samples will be collected from 0 to 0.5 feet along the eastern portion of the railroad spur to evaluate the presence of pesticides in this area. This will result in 13 samples along the northern boundary of the property. This is an area receiving a significant volume of runoff from east to west during storm runoff events.

5.0 MAPS

The following location maps provide site location in the Phoenix area.



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The Earth Technology Corporation

Project No: 90-621
Chemonics

SITE LOCATION
734 EAST SOUTH PACIFIC DRIVE
PHOENIX, ARIZONA

Figure 5-1

12-90

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5-2

6.0 REQUEST FOR ANALYSIS

Soil samples collected at the Phoenix facility will be analyzed for organochlorine pesticides/PCB's using Environmental Protection Agency (EPA) method 8080. The methods of analysis were selected based on the following contaminants detected previously at an adjacent facility and on historical on-site chemical usage:

- o PCB's, chlorinated pesticides (Method 8080).

7.0 SAMPLING METHODS AND PROCEDURES

7.1 SAMPLE COLLECTION TECHNIQUES

Soil sampling will be performed using a 3-inch diameter stainless-steel hand auger. Soil samples will be collected using the following procedure:

1. Advance the pre-cleaned hand auger into the soil by twisting the "T" handle. Based upon the length of the core barrel, the auger will be advanced in 6-inch intervals.
2. When the core barrel is full, withdraw the auger and extrude the soil into an appropriate sample container.
3. Check that a Teflon™ liner is present in the lid of the sample container, if required. Secure the lid tightly. Label the sample container with the appropriate sample tag. Be sure to label the tag carefully and clearly, addressing all the categories or parameters. Place chain-of-custody seal on sample container.
4. Place the sample container in a self-sealing plastic bag and store it in a portable cooler containing blue ice for transport to the laboratory. Complete all chain-of-custody documents and record information in the field log book.
5. Decontaminate equipment between sample locations and sampling intervals to minimize the potential for cross-contamination.

7.2 DISPOSAL OF CONTAMINATED MATERIALS

Cuttings generated during hand augering will remain on-site and will be used to back fill the boreholes.

7.3 EQUIPMENT DECONTAMINATION

Appropriate tools and materials used during hand augering and sampling will be thoroughly cleaned before and after use at each sampling station to minimize the potential for cross-contamination and to maintain the integrity of samples. The materials and equipment cleaning procedures to be used are summarized in Table 7-1.

TABLE 7-1. SUMMARY OF EQUIPMENT CLEANING PROCEDURES

Equipment/Material Description	Cleaning Procedure	Drying Procedure
Hand auger	A	C
Sample containers	B	B
Portable ice coolers	D	C

Cleaning and Drying Procedures:

A - Alconox™ detergent wash, fresh water rinse twice, final rinse with deionized water.

B - Cleaned and prepared in accordance with the following I-Chem sample container cleaning procedures: thoroughly wash containers with detergent and hot water; triple rinse with tap water; triple rinse with D.I. water; rinse with 0.5% nitric acid and drain; rinse with D.I. water and drain thoroughly. Sample containers will be prepared by analytical laboratory prior to receipt by Earth Technology.

C - Air dried on racks or plastic tarps

D - Wiped clean with detergent solution.

7.4 SAMPLE CONTAINERS AND PRESERVATION

Following sample collection, the sample containers will be immediately placed in a cooler containing blue ice until they are delivered to the laboratory.

7.5 SAMPLE PACKAGING AND SHIPMENT

Soil sample jars will be sealed individually in self-sealing plastic bags, stored in a portable cooler containing blue ice, and transported to the laboratory for analysis. Samples will be transported to the laboratory within 24 hours of collection following standard chain-of-custody procedures. Samples to be stored overnight will be placed in a secure, indoor area and the cooler will be sealed to detect tampering.

Shipping containers will meet applicable state and federal Department of Transportation requirements for safe transport. Additionally, the containers will be sealed in a manner such that obvious tampering can be detected immediately upon receipt by the testing laboratory. The field chain-of-custody form will be affixed to the outside of the shipping container in a sealed clear plastic envelope. Using this technique, tampering with the form can easily be noted.

7.6 SAMPLE DOCUMENTATION

Sample documentation components include sample labels, sample seals, field log book, and chain-of-custody forms. Samples will be labeled at the time of collection with the following information:

- Project number
- Sample location
- Sample ID number
- Depth
- Matrix
- Preservative (if applicable)
- Date and time of sampling
- Initials of collector
- Supplier container lot number.

In order to discourage unauthorized tampering, sample seals will be placed over the container lid and will include the following information:

- Project number
- Sample location
- Sample ID number
- Date and time
- Initials of collector.

All information pertinent to the sampling program will be recorded in a field log. This includes, but is not limited to, the following items:

- Project name and number
- Location of site
- Site contact(s)
- Purpose of sampling
- Date and time of collection
- Sampling locations, sample ID numbers, and methodology
- Number and volume of samples taken
- Field observations (e.g., sample descriptions)
- Sample distribution
- Maps, photographs, and/or drawings
- Field measurements
- Sampling personnel.

After each sample is collected, the chain-of-custody record will be completed. The chain-of-custody record will always accompany the samples. The chain-of-custody for possession and responsibility of samples will be documented from the time and place of sample acquisition to the time and place of their final destination. Field personnel initially collecting the sample will be responsible for the care and custody of the sample until it is properly transferred to delivery or laboratory personnel.

The chain-of-custody form provides the sample identification number, date, time, matrix, number of containers, sampler's signature, project number, project name, and analysis required. Each person or organization who relinquishes and/or receives responsibility for the samples shall sign, date, and retain one copy of the record for the project files. The original record shall stay with the samples until they are relinquished to the laboratory receiving agent.

8.0 SITE SAFETY PLAN

Earth Technology has prepared the following Site Safety Plan (SSP) for Earth Technology personnel for activities at the Chemonics site in Phoenix, Arizona. The purpose of the SSP is to:

- Establish personnel safety/protection standards that meet or exceed regulatory requirements for hazardous waste site workers
- Define responsibilities of different organizations and personnel
- Establish safe operating procedures relative to physical and chemical conditions encountered on the site
- Delineate contaminated work areas
- Provide for contingencies which may arise during the course of sampling activities.

This plan outlines the health and safety procedures and equipment required for sampling activities at the site in order to minimize the potential for chemical exposure of field personnel. The procedures and equipment requirements presented herein were developed based on a review of available data and an evaluation of the potential hazards associated with exposure to contaminants during sampling activities.

8.1 HEALTH AND SAFETY RESPONSIBILITIES

A Site Health and Safety Officer (SHSO) will be designated for the sampling investigation. The responsibilities of the SHSO will be as follows:

- Ensure that all personnel allowed to enter the site are aware of the potential hazards associated with substances known or suspected to be present at the site
- Ensure that said personnel are aware of the provisions of the SSP and are instructed in the safety practices defined in the plan, including emergency procedures
- Ensure that the appropriate safety equipment is available and properly utilized by all personnel on the site.

Additionally, the SHSO may alter the SSP to fit onsite conditions.

8.2 HAZARD ASSESSMENT

8.2.1 Potential Chemical Exposure

Previous site assessments conducted by WRA at adjacent facilities indicated elevated levels of chlorinated pesticides, and PCB's. Based on reported analyses, the concentrations of these compounds in soils are at a level which should not pose a significant health risk. The level of personnel protection will be Level "D" protection, with a possible upgrade to Level "C".

8.2.2 Heat Stress

The heat stress load on the site workers will be assessed continuously by supervisors and the SHSO. Heat stress monitoring will not be performed if temperatures do not present any immediate health hazard.

The wearing of protective clothing in warm environments creates a heat stress potential. Some of the following control measures may be used to help control heat stress:

- Provision of adequate liquids to replace lost body fluids
- Availability of electrolyte replacement fluids for use
- Establishment of a work regime to provide adequate rest periods for cooling down
- Cool area designated as the rest area.

Some symptoms of heat exhaustion are clammy skin, light-headedness, slurred speech, rapid pulse, fatigue, confusion, fainting, and nausea. The following steps should be taken if a person shows signs of heat exhaustion:

1. Take the victim to a cooler, uncontaminated area
2. Remove protective clothing
3. Give water to drink, if conscious
4. Allow to rest.

Symptoms of heat stroke are similar to heat exhaustion and include hot skin (temperature rise), incoherence, mental confusion, convulsions and unconsciousness. If a person shows signs of heat stroke, follow the steps listed above and include these steps:

5. Cool the victim with water, cold compresses, and/or fanning
6. Transport the victim to a medical facility.

Heat stroke is a medical emergency!

Temperatures at or below freezing are not characteristic of this area and will not affect persons working outdoors.

8.2.3 General Safety Practices

The following general safety practices will be observed during sample plan implementation:

1. All personnel going to the site will be thoroughly briefed on the anticipated hazards, equipment requirements, safety practices, emergency procedures, and communication methods.
2. Medical evaluation of all personnel entering the site will be performed prior to project commencement to ensure that there are no preexisting conditions that would prevent personnel from wearing respiratory protection or performing the tasks required of their respective jobs.
3. Eating, chewing gum or tobacco, or taking medication will be prohibited in contaminated or potentially contaminated areas or where the possibility for transfer of contamination exists. Smoking will be prohibited in work zones throughout the site.
4. Thorough washing of hands will be required before eating and when leaving the work area.
5. The field crew will, to the extent possible, avoid contact with potentially contaminated surfaces. The field crew will also avoid, whenever possible, kneeling on the ground and leaning or sitting on drums, equipment, or ground. Monitoring equipment shall not be placed on potentially contaminated surfaces (e.g., drums, ground, etc.).
6. No beard or facial hair which interferes with a satisfactory qualitative respirator fit test will be allowed for field crew personnel requiring respiratory protection.
7. Personnel will be familiar with and knowledgeable about standard operating safety procedures for both equipment utilization and site considerations.
8. Personnel will be familiar with, knowledgeable about, and adhere to instructions in the SSP.
9. Consideration shall be made for fatigue, heat stress, and other environmental factors influencing the health of personnel.
10. Designated and approved respiratory protective devices and protective clothing shall be worn as instructed by the SHSO.

11. Sampling tools (shovels, trowels, etc.) shall be washed with detergent and water and rinsed well. Tool decontamination shall be performed on the site.

8.3 PERSONAL PROTECTION EQUIPMENT

Level "D" protection will be worn as long as there is not indication of the presence of airborne health hazards. If the SHSO determines that enough dust is generated to be considered a health hazard, an upgrade in respiratory protection equipment will be implemented. Personnel will carry Level "C" protective gear and be prepared to upgrade to this level if necessary.

Level D Personnel Protective Equipment

- Coveralls
- Gloves
- Boots/shoes, leather or chemical-resistant, steel-toed
- Safety glasses or chemical splash goggles
- Hardhat
- Dust respirator (available).

Criteria for Selection of Level D Protection

Meeting any of these criteria allows use of Level D protection:

- No significant amount of dust generated during sampling operation.

Guidance on Selection Criteria

Level D protection is primarily a work uniform. It can be worn in areas where only boots can be contaminated and there are no inhalable toxic substances.

Level C Personnel Protective Equipment

- Full-or half-face, air purifying, canister-equipped respirator with high efficiency particle filters (MSHA/NIOSH approved)
- Tyvek Coveralls
- Gloves (outer), chemical-resistant (taped to chemical-resistant clothing)

- o Boots (outer), chemical-resistant, steel toe and shank (taped to chemical-resistant clothing)
- o Eye Protection or face shield
- o Hardhat.

Criteria for Selection of Level C Protection

Meeting all of these criteria permits use of Level C protection:

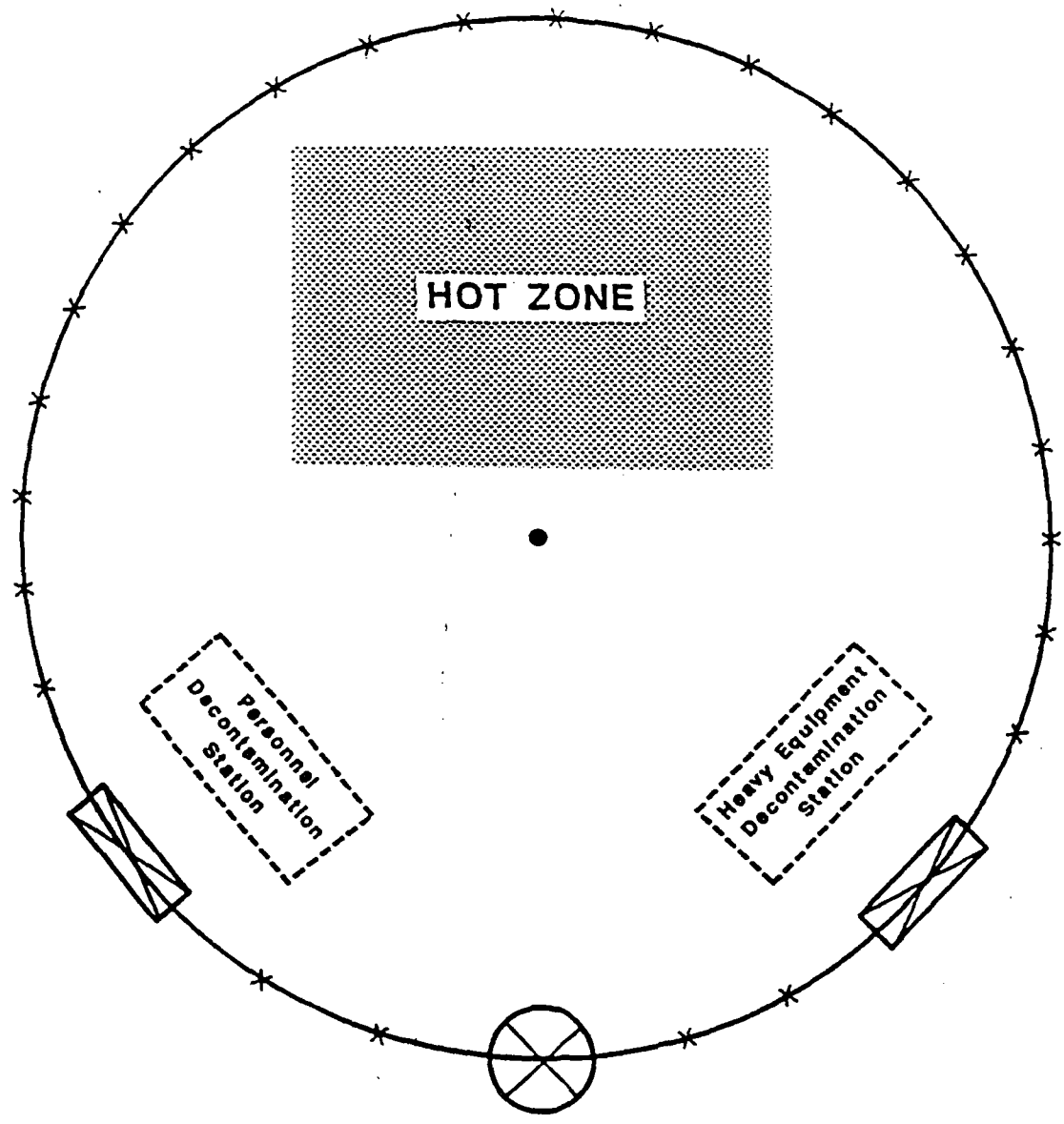
- o Physical presence of dross in noted or previous sampling data indicate dross exists
- o Measured air concentrations of identified substances will be reduced by the respirator to at, or below, the substance's exposure limit; and the concentration is within the service limit of the canister
- o Atmospheric contaminant concentrations do not exceed Immediately Dangerous to Life and Health (IDLH) levels
- o Atmospheric contaminants, or other direct contact will not adversely affect the small area of skin left unprotected by chemical-resistant clothing
- o Job functions have been determined to require no self-contained breathing apparatus.

8.4 DESIGNATION OF WORK AREAS AT THE SITE

If Level "C" protection is required, the site will be divided into two areas that will be designated as follows:

- o Exclusion Area, where contaminant exposure hazards exist and may require Level "C" protection
- o The Support Area, which is the remaining site area not requiring Level "C" protection.

The exclusion area or zone will consist of the area where sampling activities will be performed. The boundaries of the exclusion zone will be conspicuously marked with pylons and 2-inch OSHA compliance tape. Access to the exclusion zone will only be allowed to trained personnel who have read the SSP prepared for sampling activities and are wearing the correct level of protective equipment. Traffic will be restricted via controlled entrance and exit upwind of investigative activities. Figure 8-1 illustrates the exclusion zone set up and procedures.



Explanation:

- Center Point
- Traffic Control Entrance
- Traffic Control Exit
- Exclusion Boundary
- Decontamination Station Boundary

MS 03251

The Earth Technology Corporation

Project No: 90-621
Chemonics

CONTAMINATION REDUCTION SYSTEM

Figure 8-1

12-90

8.5 PERSONNEL DECONTAMINATION PROCEDURES

The extent of decontamination will be adapted to site-specific conditions. The actual conditions may require more or less intensive effort. The toxicity of contaminants or hazardous risk expected will govern the degree of decontamination. Highly toxic or skin-destructive materials will require full decontamination procedures; less hazardous substances will call for fewer decontamination procedures.

Consideration will be given to the amount and location of contaminants on the protective clothing. Visual assessment will be the usual method of estimating the magnitude of risk. A thorough decontamination will generally be required if personal protective equipment is badly contaminated. Permeation or degradation of protective clothing could occur when hazardous substances remain on these surfaces for extended time periods. In addition, contamination on the upper areas of protective clothing could present a greater risk to the field personnel. Concentrations at this higher level could be more accessible to the breathing zone. There could also be an increased probability of skin contact when personnel doff the upper clothing. Therefore, minimizing overall contamination on protective equipment and clothing will be a constant goal during drilling activities.

The type of work that each person will perform governs the potential for hazardous substance contact. Modification to decontamination protocol will be made on site as job functions dictate.

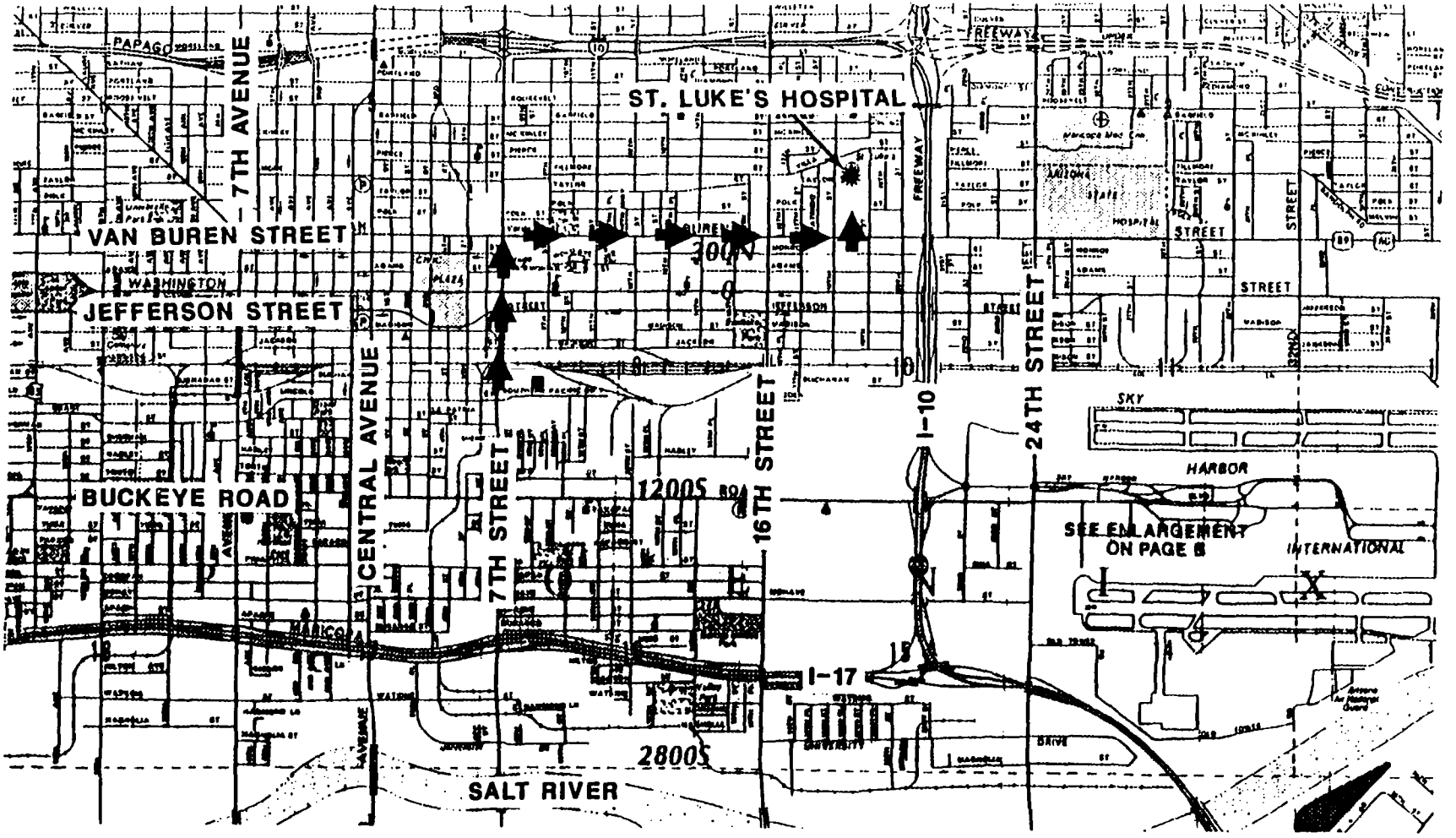
Personnel leaving the hot zone periodically may or may not need decontamination depending on their reason for leaving. For example, personnel leaving the hot zone to pick up or drop off tools and immediately returning may not require decontamination. An individual leaving to change respirator cartridges may require some degree of decontamination. However, personnel exiting the exclusion zone for a break, lunch, or at end of shift will be completely decontaminated.

8.6 EMERGENCY RESOURCES

The following emergency information will be available at the site of the sampling activities for appropriate use by site personnel.

Local Fire Department	911
Local Paramedic	911
Local Sheriff/Police	911
Local Medical Care	(602) 251-8183 St. Lukes Hospital 1800 E. Van Buren Phoenix, Arizona
Poison Center	253-3334 or 1-800-362-0101
Earth Technology Office Phil Lagas, Nick Hild	(602) 894-8482
Project Manager David Grisa	FOIA Ex. 6 (home) (602) 894-8482 (office).

MS 03254



Source: Wide World of Maps, 1990
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The Earth Technology Corporation

Project No: 90-621
Chemonics

ROUTE TO THE NEAREST HOSPITAL

Figure 8-2

12-90

APPENDIX B

LABORATORY ANALYTICAL RESULTS

AnalyticalTechnologies, Inc. 2113 S. 48th Street Suite 107 Tempe, AZ 85282 (602) 438-1530

ATI I.D. 006565

June 26, 1990

The Earth Technology Corp.
2411 W. 14th Street
Suite 210
Tempe, AZ 85281

Project Name/Number: Chemonics 90-621

Attention: Dave Grisa

On 06/06/90, Analytical Technologies, Inc. received a request to analyze soil sample(s). The sample(s) were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Due to low 8080 surrogate recovery, sample number CI-7 was reextracted and analyzed with good recovery.

If you have any questions or comments, please do not hesitate to contact us at (602)438-1530.

Elizabeth Proffitt
Project Manager

M. Barry for
Robert V. Woods
Laboratory Manager

Lorraine Davis
QA Coordinator

RVW:clf
Enclosure
90-19

MS 03257

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 00656501

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

CLIENT	: EARTH TECHNOLOGY	DATE SAMPLED	: 06/06/90
PROJECT #	: 90-621	DATE RECEIVED	: 06/06/90
PROJECT NAME	: CHEMONICS	DATE EXTRACTED	: 06/08/90
CLIENT I.D.	: CI-1-1 0-6	DATE ANALYZED	: 06/16/90
SAMPLE MATRIX	: SOIL	UNITS	: MG/KG
		DILUTION FACTOR	: 2000

COMPOUNDS	RESULTS
ALDRIN	<10.0
ALPHA - BHC	78
BETA - BHC	16
GAMMA - BHC	43
DELTA - BHC	40
CHLORDANE	<100
4,4'-DDD	780
4,4'-DDE	21
4,4'-DDT	490
DIELDRIN	<20
ENDOSULFAN I	<20
ENDOSULFAN II	<20
ENDOSULFAN SULFATE	<20
ENDRIN	<20
ENDRIN ALDEHYDE	<20
ENDRIN KETONE	<20
HEPTACHLOR	<10.0
HEPTACHLOR EPOXIDE	<10.0
METHOXYCHLOR	<100
TOXAPHENE	<200
AROCLOR 1016	<100
AROCLOR 1221	<100
AROCLOR 1232	<100
AROCLOR 1242	<100
AROCLOR 1248	<100
AROCLOR 1254	<100
AROCLOR 1260	<100

SURROGATE PERCENT RECOVERIES

DBC (%)	**

** Due to the necessary dilution of the sample, result was not attainable

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 00656502

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

CLIENT	: EARTH TECHNOLOGY	DATE SAMPLED	: 06/06/9
PROJECT #	: 90-621	DATE RECEIVED	: 06/06/9
PROJECT NAME	: CHEMONICS	DATE EXTRACTED	: 06/08/9
CLIENT I.D.	: CI-1-2	DATE ANALYZED	: 06/14/9
SAMPLE MATRIX	: SOIL	UNITS	: MG/KG
		DILUTION FACTOR	: 100

COMPOUNDS	RESULTS
ALDRIN	<0.50
ALPHA - BHC	5.4
BETA - BHC	0.47
GAMMA - BHC	13
DELTA - BHC	3.2
CHLORDANE	<5.0
4,4'-DDD	<1.0
4,4'-DDE	<1.0
4,4'-DDT	3.7
DIELDRIN	<1.0
ENDOSULFAN I	<1.0
ENDOSULFAN II	<1.0
ENDOSULFAN SULFATE	<1.0
ENDRIN	<1.0
ENDRIN ALDEHYDE	<1.0
ENDRIN KETONE	<1.0
HEPTACHLOR	<0.50
HEPTACHLOR EPOXIDE	<0.50
METHOXYCHLOR	<5.0
TOXAPHENE	<10
AROCLOR 1016	<5.0
AROCLOR 1221	<5.0
AROCLOR 1232	<5.0
AROCLOR 1242	<5.0
AROCLOR 1248	<5.0
AROCLOR 1254	<5.0
AROCLOR 1260	<5.0

SURROGATE PERCENT RECOVERIES

DBC (%)	**

** Due to the necessary dilution of the sample, result was not attainable

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 00656503

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

CLIENT	: EARTH TECHNOLOGY	DATE SAMPLED	: 06/06/9C
PROJECT #	: 90-621	DATE RECEIVED	: 06/06/9C
PROJECT NAME	: CHEMONICS	DATE EXTRACTED	: 06/08/9C
CLIENT I.D.	: CI-1-3	DATE ANALYZED	: 06/15/9C
SAMPLE MATRIX	: SOIL	UNITS	: MG/KG
		DILUTION FACTOR	: 10

COMPOUNDS	RESULTS
ALDRIN	<0.050
ALPHA - BHC	0.12
BETA - BHC	<0.050
GAMMA - BHC	0.28
DELTA - BHC	0.22
CHLORDANE	<0.5
4,4'-DDD	<0.1
4,4'-DDE	<0.1
4,4'-DDT	<0.1
DIELDRIN	<0.1
ENDOSULFAN I	<0.1
ENDOSULFAN II	<0.1
ENDOSULFAN SULFATE	<0.1
ENDRIN	<0.1
ENDRIN ALDEHYDE	<0.1
ENDRIN KETONE	<0.1
HEPTACHLOR	<0.050
HEPTACHLOR EPOXIDE	<0.050
METHOXYCHLOR	<0.5
TOXAPHENE	<1.0
AROCLOR 1016	<0.5
AROCLOR 1221	<0.5
AROCLOR 1232	<0.5
AROCLOR 1242	<0.5
AROCLOR 1248	<0.5
AROCLOR 1254	<0.5
AROCLOR 1260	<0.5
SURROGATE PERCENT RECOVERIES	
DBC (%)	85

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 00656504

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

CLIENT	: EARTH TECHNOLOGY	DATE SAMPLED	: 06/06/9
PROJECT #	: 90-621	DATE RECEIVED	: 06/06/9
PROJECT NAME	: CHEMONICS	DATE EXTRACTED	: 06/08/9
CLIENT I.D.	: CI-2-1	DATE ANALYZED	: 06/16/9
SAMPLE MATRIX	: SOIL	UNITS	: MG/KG
		DILUTION FACTOR	: 200

COMPOUNDS	RESULTS
ALDRIN	<1.00
ALPHA - BHC	<1.00
BETA - BHC	1.1
GAMMA - BHC	<1.00
DELTA - BHC	<1.00
CHLORDANE	<10.0
4,4'-DDD	7.8
4,4'-DDE	9.5
4,4'-DDT	8.7
DIELDRIN	<2.0
ENDOSULFAN I	<2.0
ENDOSULFAN II	<2.0
ENDOSULFAN SULFATE	<2.0
ENDRIN	<2.0
ENDRIN ALDEHYDE	<2.0
ENDRIN KETONE	<2.0
HEPTACHLOR	<1.00
HEPTACHLOR EPOXIDE	<1.00
METHOXYCHLOR	<10.0
TOXAPHENE	<20
AROCLOR 1016	<10.0
AROCLOR 1221	<10.0
AROCLOR 1232	<10.0
AROCLOR 1242	<10.0
AROCLOR 1248	<10.0
AROCLOR 1254	<10.0
AROCLOR 1260	<10.0

SURROGATE PERCENT RECOVERIES

DBC (%)	**

** Due to the necessary dilution of the sample, result was not attainable

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 00656505

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

CLIENT	: EARTH TECHNOLOGY	DATE SAMPLED	: 06/06/9(
PROJECT #	: 90-621	DATE RECEIVED	: 06/06/9(
PROJECT NAME	: CHEMONICS	DATE EXTRACTED	: 06/08/9(
CLIENT I.D.	: CI-2-2	DATE ANALYZED	: 06/15/9(
SAMPLE MATRIX	: SOIL	UNITS	: MG/KG
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
ALDRIN	<0.005
ALPHA - BHC	0.0064
BETA - BHC	0.027
GAMMA - BHC	<0.005
DELTA - BHC	<0.005
CHLORDANE	<0.05
4,4'-DDD	<0.01
4,4'-DDE	<0.01
4,4'-DDT	0.016
DIELDRIN	<0.01
ENDOSULFAN I	<0.01
ENDOSULFAN II	<0.01
ENDOSULFAN SULFATE	<0.01
ENDRIN	<0.01
ENDRIN ALDEHYDE	<0.01
ENDRIN KETONE	<0.01
HEPTACHLOR	<0.005
HEPTACHLOR EPOXIDE	<0.005
METHOXYCHLOR	<0.05
TOXAPHENE	<0.1
AROCLOR 1016	<0.05
AROCLOR 1221	<0.05
AROCLOR 1232	<0.05
AROCLOR 1242	<0.05
AROCLOR 1248	<0.05
AROCLOR 1254	<0.05
AROCLOR 1260	<0.05
SURROGATE PERCENT RECOVERIES	
DBC (%)	91

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 00656506

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

CLIENT	: EARTH TECHNOLOGY	DATE SAMPLED	: 06/06/9
PROJECT #	: 90-621	DATE RECEIVED	: 06/06/9
PROJECT NAME	: CHEMONICS	DATE EXTRACTED	: 06/08/9
CLIENT I.D.	: CI-2-3	DATE ANALYZED	: 06/15/9
SAMPLE MATRIX	: SOIL	UNITS	: MG/KG
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
ALDRIN	<0.005
ALPHA - BHC	<0.005
BETA - BHC	0.0065
GAMMA - BHC	<0.005
DELTA - BHC	<0.005
CHLORDANE	<0.05
4,4'-DDD	<0.01
4,4'-DDE	<0.01
4,4'-DDT	<0.01
DIELDRIN	<0.01
ENDOSULFAN I	<0.01
ENDOSULFAN II	<0.01
ENDOSULFAN SULFATE	<0.01
ENDRIN	<0.01
ENDRIN ALDEHYDE	<0.01
ENDRIN KETONE	<0.01
HEPTACHLOR	<0.005
HEPTACHLOR EPOXIDE	<0.005
METHOXYCHLOR	<0.05
TOXAPHENE	<0.1
AROCLOR 1016	<0.05
AROCLOR 1221	<0.05
AROCLOR 1232	<0.05
AROCLOR 1242	<0.05
AROCLOR 1248	<0.05
AROCLOR 1254	<0.05
AROCLOR 1260	<0.05
SURROGATE PERCENT RECOVERIES	
DBC (%)	92

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 00656507

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

CLIENT	: EARTH TECHNOLOGY	DATE SAMPLED	: 06/06/9
PROJECT #	: 90-621	DATE RECEIVED	: 06/06/9
PROJECT NAME	: CHEMONICS	DATE EXTRACTED	: 06/08/9
CLIENT I.D.	: CI-3-1	DATE ANALYZED	: 06/01/9
SAMPLE MATRIX	: SOIL	UNITS	: MG/KG
		DILUTION FACTOR	: 5

COMPOUNDS	RESULTS
ALDRIN	<0.025
ALPHA - BHC	<0.025
BETA - BHC	0.041
GAMMA - BHC	<0.025
DELTA - BHC	<0.025
CHLORDANE	<0.25
4,4'-DDD	0.16
4,4'-DDE	0.15
4,4'-DDT	0.13
DIELDRIN	<0.05
ENDOSULFAN I	<0.05
ENDOSULFAN II	<0.05
ENDOSULFAN SULFATE	<0.05
ENDRIN	<0.05
ENDRIN ALDEHYDE	<0.05
ENDRIN KETONE	<0.05
HEPTACHLOR	<0.025
HEPTACHLOR EPOXIDE	<0.025
METHOXYCHLOR	<0.25
TOXAPHENE	0.99
AROCLOR 1016	<0.25
AROCLOR 1221	<0.25
AROCLOR 1232	<0.25
AROCLOR 1242	<0.25
AROCLOR 1248	<0.25
AROCLOR 1254	<0.25
AROCLOR 1260	<0.25
SURROGATE PERCENT RECOVERIES	
DBC (%)	113

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 00656508

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

CLIENT	: EARTH TECHNOLOGY	DATE SAMPLED	: 06/06/9
PROJECT #	: 90-621	DATE RECEIVED	: 06/06/9
PROJECT NAME	: CHEMONICS	DATE EXTRACTED	: 06/08/9
CLIENT I.D.	: CI-3-2	DATE ANALYZED	: 06/15/9
SAMPLE MATRIX	: SOIL	UNITS	: MG/KG
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
ALDRIN	<0.005
ALPHA - BHC	<0.005
BETA - BHC	<0.005
GAMMA - BHC	<0.005
DELTA - BHC	<0.005
CHLORDANE	<0.05
4,4'-DDD	<0.01
4,4'-DDE	<0.01
4,4'-DDT	<0.01
DIELDRIN	<0.01
ENDOSULFAN I	<0.01
ENDOSULFAN II	<0.01
ENDOSULFAN SULFATE	<0.01
ENDRIN	<0.01
ENDRIN ALDEHYDE	<0.01
ENDRIN KETONE	<0.01
HEPTACHLOR	<0.005
HEPTACHLOR EPOXIDE	<0.005
METHOXYCHLOR	<0.05
TOXAPHENE	<0.1
AROCLOR 1016	<0.05
AROCLOR 1221	<0.05
AROCLOR 1232	<0.05
AROCLOR 1242	<0.05
AROCLOR 1248	<0.05
AROCLOR 1254	<0.05
AROCLOR 1260	<0.05
SURROGATE PERCENT RECOVERIES	
DBC (%)	89

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 00656509

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

CLIENT	: EARTH TECHNOLOGY	DATE SAMPLED	: 06/06/90
PROJECT #	: 90-621	DATE RECEIVED	: 06/06/90
PROJECT NAME	: CHEMONICS	DATE EXTRACTED	: 06/08/90
CLIENT I.D.	: CI-3-3	DATE ANALYZED	: 06/15/90
SAMPLE MATRIX	: SOIL	UNITS	: MG/KG
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
ALDRIN	<0.005
ALPHA - BHC	<0.005
BETA - BHC	<0.005
GAMMA - BHC	<0.005
DELTA - BHC	<0.005
CHLORDANE	<0.05
4,4'-DDD	<0.01
4,4'-DDE	<0.01
4,4'-DDT	<0.01
DIELDRIN	<0.01
ENDOSULFAN I	<0.01
ENDOSULFAN II	<0.01
ENDOSULFAN SULFATE	<0.01
ENDRIN	<0.01
ENDRIN ALDEHYDE	<0.01
ENDRIN KETONE	<0.01
HEPTACHLOR	<0.005
HEPTACHLOR EPOXIDE	<0.005
METHOXYCHLOR	<0.05
TOXAPHENE	<0.1
AROCLOR 1016	<0.05
AROCLOR 1221	<0.05
AROCLOR 1232	<0.05
AROCLOR 1242	<0.05
AROCLOR 1248	<0.05
AROCLOR 1254	<0.05
AROCLOR 1260	<0.05
SURROGATE PERCENT RECOVERIES	
DBC (%)	105

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 00656510

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

CLIENT	: EARTH TECHNOLOGY	DATE SAMPLED	: 06/06/
PROJECT #	: 90-621	DATE RECEIVED	: 06/06/
PROJECT NAME	: CHEMONICS	DATE EXTRACTED	: 06/08/
CLIENT I.D.	: CI-4	DATE ANALYZED	: 06/16/
SAMPLE MATRIX	: SOIL	UNITS	: MG/KG
		DILUTION FACTOR	: 500

COMPOUNDS	RESULTS
ALDRIN	<2.50
ALPHA - BHC	<2.50
BETA - BHC	<2.50
GAMMA - BHC	<2.50
DELTA - BHC	<2.50
CHLORDANE	<25.0
4,4'-DDD	<5.0
4,4'-DDE	59
4,4'-DDT	23
DIELDRIN	7.0
ENDOSULFAN I	<5.0
ENDOSULFAN II	<5.0
ENDOSULFAN SULFATE	<5.0
ENDRIN	<5.0
ENDRIN ALDEHYDE	<5.0
ENDRIN KETONE	<5.0
HEPTACHLOR	<2.50
HEPTACHLOR EPOXIDE	<2.50
METHOXYCHLOR	<25.0
TOXAPHENE	130
AROCLOR 1016	<25.0
AROCLOR 1221	<25.0
AROCLOR 1232	<25.0
AROCLOR 1242	<25.0
AROCLOR 1248	<25.0
AROCLOR 1254	<25.0
AROCLOR 1260	<25.0

SURROGATE PERCENT RECOVERIES

DBC (%)	**

** Due to the necessary dilution of the sample, result was not attainable

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 00656511

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

CLIENT	: EARTH TECHNOLOGY	DATE SAMPLED	: 06/06/90
PROJECT #	: 90-621	DATE RECEIVED	: 06/06/90
PROJECT NAME	: CHEMONICS	DATE EXTRACTED	: 06/08/90
CLIENT I.D.	: CI-5	DATE ANALYZED	: 06/14/90
SAMPLE MATRIX	: SOIL	UNITS	: MG/KG
		DILUTION FACTOR	: 100

COMPOUNDS	RESULTS
ALDRIN	<0.50
ALPHA - BHC	<0.50
BETA - BHC	<0.50
GAMMA - BHC	<0.50
DELTA - BHC	<0.50
CHLORDANE	<5.0
4,4'-DDD	4.1
4,4'-DDE	2.6
4,4'-DDT	3.6
DIELDRIN	<1.0
ENDOSULFAN I	<1.0
ENDOSULFAN II	<1.0
ENDOSULFAN SULFATE	<1.0
ENDRIN	<1.0
ENDRIN ALDEHYDE	<1.0
ENDRIN KETONE	<1.0
HEPTACHLOR	<0.50
HEPTACHLOR EPOXIDE	<0.50
METHOXYCHLOR	<5.0
TOXAPHENE	10
AROCLOR 1016	<5.0
AROCLOR 1221	<5.0
AROCLOR 1232	<5.0
AROCLOR 1242	<5.0
AROCLOR 1248	<5.0
AROCLOR 1254	<5.0
AROCLOR 1260	<5.0

SURROGATE PERCENT RECOVERIES

DBC (%)	**

** Due to the necessary dilution of the sample, result was not attainable

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 00656512

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

CLIENT	: EARTH TECHNOLOGY	DATE SAMPLED	: 06/06/9(
PROJECT #	: 90-621	DATE RECEIVED	: 06/06/9(
PROJECT NAME	: CHEMONICS	DATE EXTRACTED	: 06/08/9(
CLIENT I.D.	: CI-6	DATE ANALYZED	: 06/14/9(
SAMPLE MATRIX	: SOIL	UNITS	: MG/KG
		DILUTION FACTOR	: 100

COMPOUNDS	RESULTS
ALDRIN	<0.50
ALPHA - BHC	<0.50
BETA - BHC	<0.50
GAMMA - BHC	<0.50
DELTA - BHC	<0.50
CHLORDANE	<5.0
4,4'-DDD	3.4
4,4'-DDE	8.3
4,4'-DDT	4.2
DIELDRIN	<1.0
ENDOSULFAN I	<1.0
ENDOSULFAN II	<1.0
ENDOSULFAN SULFATE	<1.0
ENDRIN	<1.0
ENDRIN ALDEHYDE	<1.0
ENDRIN KETONE	<1.0
HEPTACHLOR	<0.50
HEPTACHLOR EPOXIDE	<0.50
METHOXYCHLOR	<5.0
TOXAPHENE	13
AROCLOR 1016	<5.0
AROCLOR 1221	<5.0
AROCLOR 1232	<5.0
AROCLOR 1242	<5.0
AROCLOR 1248	<5.0
AROCLOR 1254	<5.0
AROCLOR 1260	<5.0

SURROGATE PERCENT RECOVERIES

DBC (%)	**

** Due to the necessary dilution of the sample, result was not attainable

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GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 00656513

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

CLIENT	: EARTH TECHNOLOGY	DATE SAMPLED	: 06/06/9
PROJECT #	: 90-621	DATE RECEIVED	: 06/06/9
PROJECT NAME	: CHEMONICS	DATE EXTRACTED	: 06/19/9
CLIENT I.D.	: CI-7	DATE ANALYZED	: 06/22/9
SAMPLE MATRIX	: SOIL	UNITS	: MG/KG
		DILUTION FACTOR	: 200

COMPOUNDS	RESULTS
ALDRIN	<1.00
ALPHA - BHC	<1.00
BETA - BHC	<1.00
GAMMA - BHC	<1.00
DELTA - BHC	<1.00
CHLORDANE	<10.0
4,4'-DDD	3.7
4,4'-DDE	33
4,4'-DDT	3.6
DIELDRIN	<2.0
ENDOSULFAN I	<2.0
ENDOSULFAN II	<2.0
ENDOSULFAN SULFATE	<2.0
ENDRIN	<2.0
ENDRIN ALDEHYDE	<2.0
ENDRIN KETONE	<2.0
HEPTACHLOR	<1.00
HEPTACHLOR EPOXIDE	<1.00
METHOXYCHLOR	<10.0
TOXAPHENE	<20
AROCLOR 1016	<10.0
AROCLOR 1221	<10.0
AROCLOR 1232	<10.0
AROCLOR 1242	<10.0
AROCLOR 1248	<10.0
AROCLOR 1254	<10.0
AROCLOR 1260	<10.0
SURROGATE PERCENT RECOVERIES	
DBC (%)	114

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GAS CHROMATOGRAPHY - RESULTS

REAGENT BLANK

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

CLIENT	: EARTH TECHNOLOGY	ATI I.D.	: 006565
PROJECT #	: 90-621	DATE EXTRACTED	: 06/08/9
PROJECT NAME	: CHEMONICS	DATE ANALYZED	: 06/14/9
CLIENT I.D.	: REAGENT BLANK	UNITS	: MG/KG
		DILUTION FACTOR	: N/A

COMPOUNDS	RESULTS
ALDRIN	<0.005
ALPHA - BHC	<0.005
BETA - BHC	<0.005
GAMMA - BHC	<0.005
DELTA - BHC	<0.005
CHLORDANE	<0.05
4,4'-DDD	<0.01
4,4'-DDE	<0.01
4,4'-DDT	<0.01
DIELDRIN	<0.01
ENDOSULFAN I	<0.01
ENDOSULFAN II	<0.01
ENDOSULFAN SULFATE	<0.01
ENDRIN	<0.01
ENDRIN ALDEHYDE	<0.01
ENDRIN KETONE	<0.01
HEPTACHLOR	<0.005
HEPTACHLOR EPOXIDE	<0.005
METHOXYCHLOR	<0.05
TOXAPHENE	<0.1
AROCLOR 1016	<0.05
AROCLOR 1221	<0.05
AROCLOR 1232	<0.05
AROCLOR 1242	<0.05
AROCLOR 1248	<0.05
AROCLOR 1254	<0.05
AROCLOR 1260	<0.05

SURROGATE PERCENT RECOVERIES

DBC (%)	88

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GAS CHROMATOGRAPHY - RESULTS

REAGENT BLANK

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

		ATI I.D.	: 006565
CLIENT	: EARTH TECHNOLOGY	DATE EXTRACTED	: 06/08/9
PROJECT #	: 90-621	DATE ANALYZED	: 06/14/9
PROJECT NAME	: CHEMONICS	UNITS	: MG/KG
CLIENT I.D.	: REAGENT BLANK	DILUTION FACTOR	: N/A

COMPOUNDS	RESULTS
ALDRIN	<0.005
ALPHA - BHC	<0.005
BETA - BHC	<0.005
GAMMA - BHC	<0.005
DELTA - BHC	<0.005
CHLORDANE	<0.05
4,4'-DDD	<0.01
4,4'-DDE	<0.01
4,4'-DDT	<0.01
DIELDRIN	<0.01
ENDOSULFAN I	<0.01
ENDOSULFAN II	<0.01
ENDOSULFAN SULFATE	<0.01
ENDRIN	<0.01
ENDRIN ALDEHYDE	<0.01
ENDRIN KETONE	<0.01
HEPTACHLOR	<0.005
HEPTACHLOR EPOXIDE	<0.005
METHOXYCHLOR	<0.05
TOXAPHENE	<0.1
AROCLOR 1016	<0.05
AROCLOR 1221	<0.05
AROCLOR 1232	<0.05
AROCLOR 1242	<0.05
AROCLOR 1248	<0.05
AROCLOR 1254	<0.05
AROCLOR 1260	<0.05

SURROGATE PERCENT RECOVERIES

DBC (%)	94

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QUALITY CONTROL DATA

ATI I.D. : 006565

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

CLIENT : EARTH TECHNOLOGY
PROJECT # : 90-621
PROJECT NAME : CHEMONICS
REF I.D. : 00656503

DATE ANALYZED : 06/19/90
SAMPLE MATRIX : SOIL
UNITS : MG/KG

COMPOUNDS	SAMPLE RESULT	CONC. SPIKED	SPIKED SAMPLE	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RI
GAMMA BHC	0.28	0.067	*	*	*	*	*
HEPTACHLOR	<0.05	0.067	0.056	84	0.060	90	7
ALDRIN	<0.05	0.067	0.054	81	0.053	79	2
DIELDRIN	<0.1	0.067	0.064	96	0.070	104	9
ENDRIN	<0.1	0.067	0.064	96	0.065	97	2
DDT	<0.1	0.067	0.066	99	0.075	112	1:

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Spiked Sample Result} - \text{Duplicate Spike Sample Result})}{\text{Average of Spiked Sample}} \times 100$$

* Result out of limits due to sample matrix interference

Analytical Technologies, Inc.

QUALITY CONTROL DATA

ATI I.D. : 006565

TEST : ORGANOCHLORINE PESTICIDES/PCB'S (EPA 8080)

CLIENT : EARTH TECHNOLOGY
PROJECT # : 90-621
PROJECT NAME : CHEMONICS
REF I.D. : 00656509

DATE ANALYZED : 06/15/90
SAMPLE MATRIX : SOIL
UNITS : MG/KG

COMPOUNDS	SAMPLE RESULT	CONC. SPIKED	SPIKED SAMPLE	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RP
GAMMA BHC	<0.005	0.067	0.057	85	0.057	85	0
HEPTACHLOR	<0.005	0.067	0.060	90	0.061	91	2
ALDRIN	<0.005	0.067	0.057	85	0.057	85	0
DIELDRIN	<0.01	0.067	0.068	101	0.070	104	3
ENDRIN	<0.01	0.067	0.067	100	0.060	90	11
DDT	<0.005	0.067	0.074	110	0.072	107	3

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Spiked Sample Result} - \text{Duplicate Spike Sample Result})}{\text{Average of Spiked Sample}} \times 100$$